

# Xiurui Zhao (赵修瑞)

1200 East California Blvd  
Pasadena, CA, 91125  
Website: <https://xiurui.github.io>  
Email: [xiurui.zhao.work@gmail.com](mailto:xiurui.zhao.work@gmail.com)

## Research Interests

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**Active Galactic Nuclei, Extragalactic Surveys, Time-Domain Astrophysics**

## Fellowships & Appointments

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<b>California Institute of Technology, Pasadena, U.S.</b>	<b>2025-</b>
Postdoctoral Scholar Research Associate, Advisor: Prof. Fiona Harrison, Dr. Daniel Stern	
<b>California Institute of Technology, Pasadena, U.S.</b>	<b>2024 Fall</b>
Visiting Scholar, Host: Prof. Fiona Harrison	
<b>University of Illinois Urbana-Champaign, Urbana, U.S.</b>	<b>2023-2025</b>
Postdoctoral Research Associate, Advisor: Prof. Yue Shen	
<b>Center for Astrophysics   Harvard &amp; Smithsonian, Cambridge, U.S.</b>	<b>2021-2023</b>
Postdoctoral Fellow, Advisors: Dr. Francesca Civano, Dr. Martin Elvis	
<b>Center for Astrophysics   Harvard &amp; Smithsonian, Cambridge, U.S.</b>	<b>2020-2021</b>
Pre-Doctoral Fellow, Advisor: Dr. Francesca Civano	

## Education

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<b>Clemson University, Clemson, U.S.</b>	<b>2016-2021</b>
Ph.D. in Astrophysics, Advisor: Prof. Marco Ajello	
Dissertation: <i>Heavily Obscured Active Galactic Nuclei in NuSTAR Era</i>	
<b>Lanzhou University, Lanzhou, China</b>	<b>2012-2016</b>
B.Sc. in Physics, Cuiying Honors College, China's Top-Notch Undergraduate Training Program	

## Honors and Awards

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Clemson University Level Outstanding Graduate Researcher (2 winners each year)	<b>2021</b>
Science College Outstanding Graduate in Discovery	<b>2021</b>
Physics Department Graduate Research Assistant	<b>2021</b>
SAO Predoctoral Fellowship	<b>2020-2021</b>
Clemson Graduate Student Travel Grant	<b>2019, 2021</b>
Cuiying Honors College Abroad Study Fellowship	<b>2014, 2015</b>

## Accepted Scientific Proposals as PI

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**23** accepted X-ray/optical/sub-mm proposals with **\$450k** grant as PI.

● **X-ray (2.5 Ms)**

- **XMM-Newton** DDT (30 ks) **2025**  
*"First X-ray Survey on the JWST-NEXUS Field"*
- **NuSTAR** Cycle 11 (100 ks *NuSTAR* + 28 ks *Swift*, ToO, \$80k) **2025**  
*"Probing the electron populations in AGN Corona with NuSTAR"*
- **Swift**-XRT ToO (18 ks) **2025**  
*"Measure the current flux of eROSITA detected high-z quasars for NuSTAR follow-up"*
- **NuSTAR** Cycle 9 (**Large**, 500 ks *NuSTAR* + 142 ks XMM, \$130k) **2023**  
*"Systematically Constraining the AGN Coronal Properties with NuSTAR Using a Sample of Luminous, High-redshift Quasars"*
- **NuSTAR** Cycle 8 (**Large**, 600 ks *NuSTAR* + 195 ks XMM, \$150k) **2022**  
*"Constraining the Properties of AGN Coronae using a Sample of Luminous, High-redshift Quasars with NuSTAR"*
- **NuSTAR** Cycle 7 (100 ks *NuSTAR* + 60 ks XMM, \$90k) **2021**  
*"Unveiling with NuSTAR the most powerful, heavily obscured, quasar ever discovered in X-rays"*
- **Swift**-XRT Cycle 19 (18 ks) **2022**  
*"Build a Sample of Luminous, High-redshift Quasars to Constrain the Properties of AGN Coronae"*
- **Swift**-XRT ToO (3 ks) **2021**  
*"Measure the X-ray flux of a rare coronal line event quasar exhibiting another optical flare"*

● **Optical (9 nights)**

- **SOAR** 4m Goodman (0.6+0.6 night) **2024B/2025A**  
*"Identify X-ray Bright Quasars to Constrain the AGN Coronae"*
- **BOK** 2.5m BCSpec (2 night), Co-PI **2024B**  
*"Redshifts of X-ray Bright Quasars to Constrain the AGN Corona"*
- **MMT** 6.5m Hectospec (0.3+0.3 night, 335 sources) **2022B & 2023A**  
*"Complete the Hectospec Spectroscopic Survey of JWST NEP Time-Domain-Field"*
- **MMT** 6.5m Binospec (0.1+0.1+0.2 night) **2022A & 2022B & 2023A**  
*Monitoring a Coronal Line Event AGN*
- **MMT** 6.5m Binospec (0.4 night, 6 sources) **2023A**  
*Identify X-ray Bright Quasars and Constrain the AGN Coronal*
- **SAO FLWO** 1.5m FAST (0.2 night) **2023A**  
*Measure the Black Hole Mass of an X-ray Bright Quasar to Constrain Its Coronal Properties*
- **SAO FLWO** 1.2m Keplercam (1+1+2 night, g, r, i) **2023A & 2022B & 2022A**  
*"Monitoring the Continuous Optical Flares of a Coronal Line Event"*

● **Sub-mm (3 tracks)**

- **Submillimeter Array** (SMA) standard science observation (3 tracks) **2022B**  
*"Monitoring with SMA a Highly Variable Flat Spectrum Radio Quasar in the JWST North Ecliptic Pole Time-Domain Field"*

## Collaboration & Professional Service

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• Member of <b>HEROIX</b> AGN Working Group	2025-
• Member of <b>Roman</b> Science Collaboration	2025-
• Member of <b>PRIMA</b> AGN Across Cosmic Time Working Group	2025-
• Member of <b>HEX-P</b> Black Hole Growth & Corona Working Group	2022-
• Member of <b>AXIS</b> AGN & Time-Domain Working Group	2022-
• Member of <b>JWST</b> PEARLS Working Group	2022-
• Member of <b>NuSTAR</b> Extragalactic Survey Team	2020-
• Member of <b>Athena</b> AGN Science Working Group	2020-
- Co-organizers of CfA High Energy Astrophysics Division Seminar	2021-2023
+ Panelist for NASA <b>NuSTAR</b> , <b>Swift</b> Proposal Review	
+ External reviewer for <b>CFHT</b>	
+ Reviewer for ApJ, A&A	

## Invited Talks

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Clemson University, two group Seminars	Apr 2025
Caltech, HEA Group Meeting	Dec 2024
Caltech, Tea Talk	May 2024
Caltech, HEA Group Meeting	May 2024
Zhejiang University, Colloquium	Sep 2023
Peking University, KIAA-DoA Seminar	Aug 2023
Tsinghua University, Departmental Seminar	Aug 2023
UIUC, local group meeting	May 2023
Yale University, Galaxy Lunch Talk	Apr 2023
MIT, Brown Bag Lunch Talk	Apr 2023
NASA GSFC, X-ray Astrophysics Laboratory AGN Seminar (Virtual)	Feb 2023
CfA, High Energy Seminar	Feb 2023
Arizona State University, Cosmology Seminar	Dec 2022
University of Arizona, Steward Observatory/NOIRLab Galaxy group seminar	Dec 2022
MIT, High Energy Astro Group seminar (Virtual)	Apr 2022
Clemson University, Local Group seminar	Apr 2022
INAF OAS, Bologna, X-ray group seminar	Sep 2019

## Contributed Talks

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AXIS Community Science Conference	Maryland, Apr 2025
High Energy Astrophysics Division 21th Meeting	Texas, Apr 2024
243st AAS Meeting	New Orleans, Jan 2024
High Energy Astrophysics Division 20th Meeting	Hawaii, Mar 2023

241st AAS Meeting	Seattle, <b>Jan 2023</b>
<i>NuSTAR</i> 2022 Conference	Italy, <b>June 2022</b>
New England Regional Quasar and AGN Meeting	Connecticut, <b>May 2022</b>
High Energy Astrophysics Division 19th Meeting ( <i>Poster</i> )	Pittsburgh, <b>Mar 2022</b>
Black Hole Across Space and Time	Virtual, <b>Dec 2021</b>
238th AAS Meeting	Virtual, <b>June 2021</b>
237th AAS Meeting	Virtual, <b>Jan 2021</b>
Supermassive Black Holes Meeting	Virtual, <b>Dec 2020</b>
235th AAS Meeting	Honolulu, <b>Jan 2020</b>
X-ray Astronomy 2019 Meeting ( <i>Poster</i> )	Bologna, Italy, <b>Sep 2019</b>
High Energy Astrophysics Division 17th Meeting ( <i>Poster</i> )	Monterey, <b>Mar 2019</b>
233rd AAS Meeting	Seattle, <b>Jan 2019</b>

## Mentoring & Assistant Experience

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Co-supervision of Clemson graduate student R. Silver (NASA Postdoc Fellow)	<b>2019-</b>
Co-supervision of Clemson graduate student A. Pizzetti (ESO Fellow)	<b>2019-2024</b>
Co-supervision of Clemson undergraduate students D. Cole and Z. Hu	<b>2019</b>
Research Assistant, Clemson	<b>2018-2020</b>
Teaching Assistant (PHYS 2230), Clemson	<b>2016-2017</b>

## Workshops & Schools

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CSST summer school at Peking University	Beijing, China, <b>July 2023</b>
Summer School for Astrostatistics at Penn State	State College, <b>Jun 2023</b>
End-to-end Simulations with SIXTE Workshop	Virtual, <b>Mar 2022</b>
2022 Submillimeter Array Interferometry School	Virtual, <b>Jan 2022</b>
Winter School at University of Freiburg	Freiburg, Germany, <b>Feb 2015</b>
Summer School at University of California, Berkeley	Berkeley, <b>Jun-July 2014</b>

## Press Release

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Webb Glimpses Field of Extragalactic PEARLS, Studded With Galactic Diamonds	<b>2022</b>
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## Outreach

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- The Silk Road Cameleers Series (Introduce AGN to Undergrads) Remote, **Apr, 2024**
- † Volunteer to teach astronomy and mathematics to elemental and high school students in the rural area of China Qiajia, **Summer, 2023**
- † Translate Sensing Dynamic Universe project into Chinese (help people with visual disability accessible to the dynamic Universe with sonified astronomical light curves and spectra) **2022-2023**

## References

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- Marco Ajello, PhD supervisor, [majello@g.clemson.edu](mailto:majello@g.clemson.edu)
- Francesca Civano, postdoc supervisor, [francesca.m.civano@nasa.gov](mailto:francesca.m.civano@nasa.gov)
- Martin Elvis, postdoc co-supervisor, [melvis@cfa.harvard.edu](mailto:melvis@cfa.harvard.edu)
- Stefano Marchesi, PhD co-supervisor, [stefano.marchesi@inaf.it](mailto:stefano.marchesi@inaf.it)
- Yue Shen, postdoc supervisor, [shenyue@illinois.edu](mailto:shenyue@illinois.edu)
- Daniel Stern, postdoc co-supervisor, [daniel.k.stern@jpl.nasa.gov](mailto:daniel.k.stern@jpl.nasa.gov)

## Publication List

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A total of **33** peer-reviewed papers, **5** submitted papers [ADS](#)

### - **First-author papers**

- 7) **X. Zhao**, S. Marchesi, M. Ajello, et al., 2024, ApJ, 975, 24  
*An X-ray Significantly Variable, Luminous, Type 2 Quasar at  $z = 2.99$  with a Massive Host Galaxy*
- 6) **X. Zhao**, F. Civano, C. N. A. Willmer, et al., 2024, ApJ, 965, 188  
*PEARLS: The NuSTAR and XMM-Newton extragalactic surveys of the JWST North Ecliptic pole Time-Domain Field II*
- 5) **X. Zhao**, F. Civano, F. M. Fornasini, et al. 2021, MNRAS, 508, 5176  
*The NuSTAR extragalactic surveys of the JWST North Ecliptic pole Time-Domain Field*
- 4) **X. Zhao**, S. Marchesi, M. Ajello, et al. 2021, A&A, 650, A57  
*The properties of the AGN torus as revealed from a set of unbiased NuSTAR observations*
- 3) **X. Zhao**, S. Marchesi, M. Ajello, et al. 2020, ApJ, 894, 71  
*A broadband X-ray study of a sample of AGNs with [OIII] measured inclinations*
- 2) **X. Zhao**, S. Marchesi, M. Ajello, 2019, ApJ, 871, 182  
*Compton-thick AGN in the NuSTAR Era. IV. A Deep NuSTAR and XMM-Newton View of the Candidate Compton-thick AGN in ESO 116-G018*
- 1) **X. Zhao**, S. Marchesi, M. Ajello, et al. 2019, ApJ, 870, 60  
*Compton-thick AGNs in the NuSTAR Era. II. A Deep NuSTAR and XMM-Newton View of the Candidate Compton-thick AGN in NGC 1358*

### - **Significantly contributed papers and mentored students\* paper**

- 13) \*R. Silver, F. Civano, **X. Zhao**, Submitted to AAS journals  
*PEARLS: NuSTAR and XMM-Newton Extragalactic Survey of the JWST North Ecliptic Pole Time-Domain Survey III*
- 12) \*A. Pizzetti, et al. (including **X. Zhao**), 2025, ApJ, 979, 170  
*Hydrogen column density variability in a sample of local Compton-thin AGN II*
- 11) F. Civano, **X. Zhao**, P. Boorman, et al., 2024, Front. Astron. Space Sci., 1340719  
*The High Energy X-ray Probe (HEX-P): X-ray population contributing to peak of the Cosmic X-ray background*

- 10) E. Kammoun, et al. (including **X. Zhao**), 2024, *Front. Astron. Space Sci.*, 1308056  
*The High Energy X-ray Probe (HEX-P): Probing the physics of X-ray corona in active galactic nuclei*
- 9) N. Torres-Albà, M. Stefano, **X. Zhao**, et al., 2023, *A&A*, 678, A154  
*Hydrogen Column Density Variability in a sample of local Compton-thin AGN*
- 8) \*R. Silver, N. Torres-Albà, **X. Zhao**, et al., 2023, *A&A*, 675, A65  
*A New Mid-Infrared and X-ray Machine Learning Algorithm to Discover Compton-thick AGN*
- 7) \*R. Silver, N. Torres-Albà, **X. Zhao**, et al. 2022, *ApJ*, 940, 148  
*Compton-thick AGN in NuSTAR Era. IX: joint NuSTAR and XMM-Newton analysis of four local AGN*
- 6) \*A. Pizzetti, et al. (including **X. Zhao**), 2022, *ApJ*, 936, 149  
*A multi-epoch X-ray study of the nearby Seyfert 2 galaxy NGC 7479: Linking column density variability to the torus geometry*
- 5) S. Marchesi, **X. Zhao**, N. Torres-Albà, et al. 2022, *ApJ*, 935, 114  
*Compton-Thick AGN in the NuSTAR era VIII: A joint NuSTAR-XMM-Newton monitoring of the changing-look Compton-thick AGN NGC 1358*
- 4) \*R. Silver, N. Torres-Albà, **X. Zhao**, et al. 2022, *ApJ*, 932, 43  
*Chandra Follow-up Observations of Swift-BAT-selected AGNs II*
- 3) N. Torres-Albà, S. Marchesi, **X. Zhao**, et al. 2021, *ApJ*, 922, 252  
*Compton-thick AGN in NuSTAR Era VI: The Observed Compton-thick Fraction in the Local Universe*
- 2) S. Marchesi, M. Ajello, **X. Zhao**, et al. 2019, *ApJ*, 882, 162  
*Compton-thick AGNs in the NuSTAR Era. V. Joint NuSTAR and XMM-Newton Spectral Analysis of Three "Soft-gamma" Candidate CT-AGNs in the Swift/BAT 100-month Catalog*
- 1) S. Marchesi, M. Ajello, **X. Zhao**, et al. 2019, *ApJ*, 872, 8  
*Compton-thick AGNs in the NuSTAR Era. III. A Systematic Study of the Torus Covering Factor*

**- Co-author papers**

- 18) S. Creech, et al. (including **X. Zhao**), Submitted to AAS journals  
*Spectral analysis of Hard X-ray Selected AGN in the NEP Field*
- 17) I. Cox, et al. (including **X. Zhao**), Submitted to AAS journals  
*A systematic search for AGN obscuration variability in the Chandra archive*
- 16) A. Banerjee, et al. (including **X. Zhao**), Submitted to AAS journals  
*Contemporaneous X-ray and Optical Polarization of EHSP Blazar H 1426+428*
- 15) K. Imam, et al. (including **X. Zhao**), Submitted to AAS journals  
*Source Identification for the Swift-BAT 150 Month Hard X-ray Catalog using Observations from Soft X-ray missions*
- 14) D. Sengupta, et al. (including **X. Zhao**), 2025, *A&A*, 697, A78  
*A Multi-Wavelength Characterization of the Obscuring Medium at the Center of NGC 6300*
- 13) N. Torres-Albà, et al. (including **X. Zhao**), 2025, *ApJ*, 981, 91  
*Swift-XRT and NuSTAR Monitoring of Obscuration Variability in Mrk 477*
- 12) I. Cox, et al. (including **X. Zhao**), 2025, *ApJ*, 979, 130  
*Chandra Follow-up Observations of Swift-BAT-Selected AGNs III*

- 11) J. García, et al. (including **X. Zhao**), 2024, Front. Astron. Space Sci., 1471585  
*The High Energy X-ray Probe (HEX-P): Science Overview*
- 10) N. S. Khatiya, et al. (including **X. Zhao**), 2024, ApJ, 971, 84  
*Characterizing the  $\gamma$ -ray Emission from FR0 Radio Galaxies*
- 9) R O'Brien, et al. (including **X. Zhao**), 2024, ApJS, 272, 19  
*TREASUREHUNT: Transients and Variability Discovered with HST in the JWST North Ecliptic Pole Time Domain Field*
- 8) P. Boorman, et al. (including **X. Zhao**), 2024, Front. Astron. Space Sci., 1335459  
*The High Energy X-ray Probe (HEX-P): Probing the circum-nuclear environment in AGN down to extremely low luminosities*
- 7) I. Cox, et al. (including **X. Zhao**), 2023, ApJ, 958, 155  
*A simple method to predict  $N_H$  variability in active galactic nuclei*
- 6) S. P. Willner, et al. (including **X. Zhao**), 2023, ApJ, 958, 176  
*PEARLS: JWST counterparts of micro-Jy radio sources in the Time Domain field*
- 5) C. N. A. Willmer, et al. (including **X. Zhao**), 2023, ApJS, 269, 21  
*PEARLS: Near Infrared Photometry in the JWST North Ecliptic Pole Time Domain Field*
- 4) Q. Yang, et al. (including **X. Zhao**), 2023, ApJ, 953, 61  
*Probing the Origin of Changing-look Quasar Transitions with Chandra*
- 3) D. Sengupta, et al. (including **X. Zhao**), 2023, A&A, 676, A103  
*Compton-thick AGN in the NuSTAR Era IX: Analysis of seven local CT-AGN candidates*
- 2) R. A. Windhorst, et al. (including **X. Zhao**), 2023, AJ, 165, 13  
*Webb's PEARLS: Prime Extragalactic Areas for Reionization and Lensing Science: Project Overview and First Results*
- 1) A. Traina, et al. (including **X. Zhao**), 2021, ApJ, 922, 159  
*Compton-Thick AGN in the NuSTAR era VII: a joint NuSTAR, Chandra and XMM-Newton analysis of two nearby, heavily obscured sources*